

REMARKS

Status of the Application

Claims 1-29 are all the claims pending in the Application, as claims 18-29 are hereby added to more fully define the current invention. Claims 1-17 have been rejected.

Obviousness Rejections

The Examiner has rejected claims 1-17 under 35 U.S.C. § 103(a). Specifically, the Examiner has rejected: (1) claims 1, 2, 3 and 9 as being unpatentable over Yano (US 4,734,734; hereinafter “Yano”) in view of Shimoda (US 6,208,829 B1; hereinafter “Shimoda”); (2) claims 1-4, 6, 7, 9, 10 and 13 as being unpatentable over Iwasaki (US 6,034,712; hereinafter “Iwasaki”) in view of Shimoda; (3) claims 5 and 8 as being unpatentable over Iwasaki in view of Shimoda in further view of Hino (JP 2000-156525; hereinafter “Hino”); (4) claims 11 and 12 as being unpatentable over Iwasaki in view of Shimoda in further view of Oku¹ (JP 63-271484; hereinafter “Oku”); and (5) claims 14-17 as being unpatentable over Iwasaki in view of Shimoda in further view of Yamakawa (US 5,923,358; hereinafter “Yamakawa”). Applicants respectfully traverse each of these rejections, for the reasons discussed in the sections below.

¹ Applicants assume the Examiner intended to apply Oku (JP 63-371484 A) and not JP 04-284484 A, which is actually to Maeda. Applicants assume the discrepancy between the reference numbers to be a typographical error. Nevertheless, as the rejection is facially unclear, it cannot support a subsequent “Final” Office Action.

The Rejection Of Independent Claim 1 Over Yano In View Of Shimoda

Yano discloses an image forming apparatus for removing an electric charge from a non-image area² (area Y in FIG. 1 or area B in FIG. 2) by fully illuminating the area via square-shaped light projections. These shaped light projections reduce the un-sharp pattern 37 shown in prior art FIG. 1.

Specifically, FIG. 2 discloses light emitting elements 12, light blocking parts 13, and image bearing member 6. (Col. 3, lines 32-38). The square illumination areas formed through the apertures 22 of light blocking parts 13 provide a clean border between image area A and non-image area B, and also overlap on image bearing member 6, which is effective to increase the light quantity between the adjacent illumination elements 12. (Col. 4, lines 18-23).

FIG. 4 of Yano discloses a second embodiment wherein a lens means for condensing light 14 is arranged between light blocking parts 13, and image bearing member 6. Lens means 14 reduces the divergent angle of the light rays (although it is unclear from FIG. 4 if the overlap is completely removed) and *increases* the light density on image bearing member 6.

Thus, it is clear that the intensity of the light directed from light emitting elements 12 onto image bearing member 6 is a very important consideration of Yano. This is entirely consistent with the purpose of Yano, which is to remove the electric charge from a non-image area in the most efficient way possible, rather than forming an image.

Further, it is clear in Yano that the light blocking parts 13 are provided to shape the light rays as they are projected onto image bearing member 6, but not necessarily to prevent the

² To reduce the waste of toner and eliminate contamination within the apparatus (see col. 1, lines 22-46).

overlap or mixing of light rays, as Yano indicates that such a situation is actually *preferred* (see above and col. 4, lines 18-23).

In complete contrast to Yano, Shimoda discloses a system that provides a latent image matrix of dots, each about .1 mm across, at a pitch of 2.25 mm across the surface of a photographic image. The dots are invisible to the naked eye, but can be read by reproduction equipment to prevent a user from making unauthorized copies of the photograph.

Shimoda discloses several variations of devices that produce such a dot pattern, of which the Examiner has specifically cited the fourth embodiment, illustrated in FIGS. 9 and 10. Specifically, feed mechanism 18 feeds photographic paper 16 to the system, and rotary encoder 34 indicates the paper's position so that light emission controller 28 can control exposure head 14 to produce the above-mentioned dots on paper 16. Exposure head 14 consists of LED chips 120, diffusion plate 130, mask 108 with openings 106, and lens array 26. Diffusion plate 130 diffuses light from LED chips 120, whereupon it passes through mask 108, and travels as beams of light each having a spot diameter of .1 mm.

Thus, it is clear that, rather than light *intensity*, minimizing the *variations* in the light emitted from exposure head 14 is important in Shimoda, as diffusion plate 130 is used in conjunction with LED chips 120 that are free to commingle their emitted rays. This is entirely consistent with the objective of Shimoda, which is to produce a light and consistent dot pattern that cannot be seen by the naked eye.

Regarding claim 1, the Examiner takes the position that Yano discloses almost all of the recited features, but fails to teach or suggest "a diffusion device for diffusing rays from said light

emitting element, to equalize luminance of rays from each light-emitting element.” (See Office Action, pg. 3, 1st full par.).

Applicants agree that Yano fails to teach or suggest such features, and respectfully submit that one of skill would never have added such features to Yano, as they would tend to decrease the intensity of the emitted light (contrary to Yano’s stated goal).

Nevertheless, the Examiner has taken the position that such features are shown in Shimoda (diffusion plate 130), and that it would have been obvious to one of ordinary skill “to incorporate a diffusion device as taught by Shimoda in the device of Yano.” The Examiner alleges that the “motivation for doing so would have been to uniformize the entire light quantity and to attain the reduction in cost by means of low power consumption.”

However, Applicants respectfully submit that the Examiner’s alleged motivation finds no support in Yano. Specifically, Applicants respectfully submit that Yano provides no teaching or suggestion that it would somehow be desirable to “uniformize” the light quantity emitted by light emitting means 12. First, there is no teaching or suggestion that the light emitted from these features is not uniform. Further, Yano is directed to removing the electric charge from a non-image portion B of image bearing member 6, not to providing an image on member 6. Thus, the uniformity is irrelevant.

Further, the Examiner’s alleged motivation that that cost would somehow be reduced “by means of low power consumption” if a diffusion plate were installed in the system of Yano is simply incorrect. A diffusion plate does not *increase* the transmittance of light intensity, but rather scatters and *reduces* the intensity of light. Thus, to achieve a similar intensity level of

light, the power would actually have to be *increased*, i.e., directly opposite of the Examiner's reasoning. Applicants respectfully submit that this is yet another reason why one of skill would not have modified Yano as the Examiner alleges.

Lastly, Applicants respectfully submit that, in general, Yano is directed towards *increasing* the intensity of light directed upon image bearing member 6. As discussed above, the provision of a diffusion plate between lens means 14 and light emitting means 12 (as the Examiner seemingly suggests) would *decrease* the intensity of light emitted on image bearing member 6. Thus, one of skill would not have been motivated to add such a diffusion member.

Accordingly, Applicants respectfully submit that one of skill would not have been motivated to modify Yano in view of Shimoda, and therefore submit that independent claim 1 is patentable over the applied references. Further, Applicants respectfully submit that dependent claims 2-12 are allowable, *at least* by virtue of their dependency.

Thus, Applicants respectfully request that the Examiner withdraw this rejection.

The Rejection of Independent Claim 1 over Iwasaki in view of Shimoda

Iwasaki discloses an image forming apparatus for forming images on micro-capsule coated sheets 37 (see FIG. 3). FIG. 1 shows a substrate 1 with red LED 7, green LED 8 and blue LED 9 respectively arranged in recesses 4 and covered by transparent shielding material 11, with mask 14 having pinholes 12 arranged thereon. (Col. 8, lines 40-63). The walls 5 of the recesses 3 reflect light from the LED's 7-9. (See col. 9, lines 12-14). The surface of the mask 13 that is opposed to the substrate 1 is subjected to reflection-free treatment. (Col. 9, lines 54-57). Thus, light not passing through the pinholes 12 of the mask 13 can be absorbed, which prevents stray light and deterioration of the image quality.

FIG. 10 shows that lenses 222 can be used in conjunction with pinholes 12. (Col. 19, lines 45-55). FIG. 14 discloses another embodiment, which adds partition walls 222 arranged between portions containing the LED's 7, 8 and 9 to prevent commingling of the colors emitted from the respective LED's. (Col. 22, lines 51-67).

Shimoda is discussed in detail above.

The Examiner takes the position that Iwasaki discloses almost all of the features of independent claim 1, but fails to teach or suggest "a diffusion device for diffusing rays from said light emitting elements, to equalize luminance of rays from each light emitting element."

Applicants agree that Iwasaki fails to teach or suggest such features. Further, Applicants respectfully submit that one of skill would never have added such features to Iwasaki, as one of the specific purposes of mask 13 (*i.e.*, to absorb light that does not pass through the pinholes 12 in order to prevent the occurrence of stray light) would make the provision of such a diffusion device ineffectual.

Nevertheless, the Examiner has alleged that such a feature is shown in Shimoda (diffusion plate 130), and that it would have been obvious to one of ordinary skill "to incorporate a diffusion device as taught by Shimoda in the device of Iwasaki." The Examiner alleges that the "motivation for doing so would have been to uniformize the entire light quantity and to attain the reduction in cost by means of low power consumption."

However, Applicants respectfully submit that the Examiner's alleged motivation finds no support in Iwasaki (or Shimoda). Specifically, Applicants respectfully submit that Iwasaki

provides no teaching or suggestion that it would somehow be desirable to further “uniformize” the light quantity emitted by LED’s 7, 8 or 9 through pinholes 12 in mask 13.

First, there is no teaching or suggestion that the light emitted from these features is not uniform. In fact, LED’s 7, 8 and 9 are provide in recesses 4, which provide reflective sides 5. Thus, both direct and reflected light in different directions (*i.e.*, uniform) are incident upon respective pinholes 12. There is simply no need to provide a separate diffusion device to further “uniformize” the incident light.

Further, pinholes 12 are quite small, and thus necessarily only release a small beam of light. Thus, there is simply no reason to add a diffusion member whose sole purpose would be to provide a uniform appearance of a light source over a larger area.

Still further, as discussed above, the Examiner’s alleged motivation that that cost would somehow be reduced “by means of low power consumption” if a diffusion plate were installed in the system of Iwasaki is simply incorrect. A diffusion plate does not *increase* the transmittance of light intensity, but rather scatters and *reduces* the intensity of light. Thus, to achieve a similar intensity level of light, the power would actually have to be *increased*, *i.e.*, directly opposite of the Examiner’s reasoning. Applicants respectfully submit that this is yet another reason why one of skill would not have modified Iwasaki as the Examiner alleges.

Thus, Applicants respectfully submit that independent claim 1 is patentable over the applied references. Further, Applicants respectfully submit that dependent claims 2-12 are allowable, *at least* by virtue of their dependency.

Thus, Applicants respectfully request that the Examiner withdraw this rejection.

The Rejection of Dependent Claims 5 and 8 over Iwasaki in view of Shimoda and Hino

Iwasaki and Shimoda are fully discussed above. Hino is directed towards improving the equalization of light emission from a multi-LED system. As shown in FIG. 2, Hino discloses a LED 1 in case 5 buried in resin 4, which has a powder mixed in with the resin to provide a diffusion effect or a reflection effect to enable the entire mold to emit light.

Thus, similarly to Shimoda, Hino is narrowly directed towards a system for equalizing LED illumination. Therefore, the disclosure of Hino is as deficient as that of Shimoda regarding any support of the Examiner's alleged motivation to modify Iwasaki in view of either of these references.

The Rejection of Dependent Claims 11 and 12 over Iwasaki in view of Shimoda and Oku

Iwasaki and Shimoda are fully discussed above. Oku discloses (see FIG. 1a) a housing 51 with a partition wall 51b for shielding a light beam between LED columns a and b (see FIG. 1b). The position of the array direction of each LED of an even column (*i.e.*, LEDs 2, 4, 6 ...) is shifted from a position of the array direction of each LED of an odd column (*i.e.*, LEDs 1, 3, 5 ...), but are otherwise quite tightly arranged. (See abstract).

The Examiner takes the position that Iwasaki, as modified by Shimoda, "discloses all the basic limitations ... except for the arrangement of the rows of the light emitting elements."

Applicants agree that neither Iwasaki nor Shimoda (nor any alleged combination thereof) teach or suggest such features.

Nevertheless, the Examiner takes the position that Oku discloses light emitting elements "being spaced from each other by a distance that is equal to a length of each light emitting element in the perpendicular direction." The Examiner alleges that one of skill would have been

motivated to modify Iwasaki and Shimoda in view of Oku “for the purpose of providing a high resolution of printed dots.”

However, Applicants respectfully submit that neither Iwasaki, Shimoda, Oku, nor any alleged combination thereof, teaches or suggests that “said light emitting elements of each row are spaced from each other by a distance that is equal to or slightly less than a length of each light emitting element in the perpendicular direction to the conveying direction of said photosensitive material,” as recited in claim 11.

Specifically, to the extent that FIG. 1 *could* be interpreted, LED’s 1 and 3 of Oku are not “spaced from each other by a distance that is equal to or slightly less than a length of” element 1, for example. Rather, LED’s 1 and 3 are arranged almost adjacently to each other.

In any event, Applicants respectfully submit that FIG. 1 of Oku cannot provide a sufficient basis to reject the dimensional recitations of claim 11. Specifically, it has long been held that, when the reference does not disclose that the drawings are to scale and is silent as to dimensions, arguments based on measurement of the drawing features are of little value. See *Hockerson-Halberstadt, Inc. v. Avia Group, Int’l*, 222 F.3d 951, 956, 55 USPQ2d 1487, 1491 (Fed. Cir. 2000); *MPEP* § 2125.

Thus, Applicants respectfully submit that dependent claims 11 is separately patentable over the applied references.

Regarding claim 12, Applicants respectfully submit that the Examiner has failed to specifically address any of the features of this claim, or explain how the alleged combination of references would disclose such features.

Further, Applicants respectfully submit that claim 12's recitation that "adjacent two rows of said light emitting elements are paired to emit rays of a different color from other pairs of rows of said light emitting elements, thereby to print said latent image in different colors" is not taught or suggested by Iwasaki, Shimoda, Oku, or any alleged combination thereof.

Specifically, Oku fails to teach or suggest any capability to produce the colors as claimed, and there is no teaching or suggestion of any "other pairs of rows of light emitting elements" in any of the applied references.

Thus, Applicants respectfully submit that dependent claim 12 is separately patentable over the applied references.

Thus, Applicants respectfully request that the Examiner withdraw this rejection.

The Rejection Of Independent Claim 14 Over Iwasaki In View Of Shimoda And Yamakawa

Iwasaki and Shimoda are fully discussed above. Yamakawa discloses (see FIG. 1) a laser printer apparatus that seeks to eliminate the use of polygon mirrors by utilizing a semiconductor laser array light source 1 composed of a number of semiconductor laser devices 1a arranged in a row, a photosensitive surface 2, and an imaging lens 3 for forming images of luminous fluxes from laser devices 1a in a row on photosensitive surface 2. (Col. 1, lines 39-47).

FIG. 4 of Yamakawa illustrates another embodiment using a plurality of light sources 21a, 21b and 21c, each transmitting one of the three primary colors, and each comprising semiconductor laser devices 1a arranged in a row. The light sources 21a, 21b and 21c are arranged as shown in FIG. 4, with sources 21b and 21c emitting light orthogonally to that emitted from source 21a. Half mirrors 24a and 24b are arranged to direct the light emitted from

light sources 21b and 21c towards imaging lens 23, and also to transmit portions of the light from sources 21a and 21b.

Thus, Yamakawa discloses a system that uses a single row of LEDs for single color light emission (FIG. 1), and adds a second and third row, arranged apart from each other, for the emission of multi-color light (FIG. 4).

The Examiner takes the position that an alleged combination of Iwasaki and Shimoda discloses all the features of claims 14-17, except “for the plurality of printing heads, and the dichroic mirrors.” (See Office Action, pg. 8, 1st full par.).

Applicants agree that neither Iwasaki, Shimoda, nor any alleged combination thereof teach or suggest such features.

Nevertheless, the Examiner takes the position that Yamakawa discloses such features, and that one of skill would have modified the alleged combination of Iwasaki and Shimoda “for the purpose of recording color image on the photosensitive material with combined light sources of three primary colors.”

However, Applicants respectfully submit that one of skill at the time of the invention would not have modified Iwasaki in view of Shimoda (for the reasons discussed above) and further would not have modified Iwasaki in view of Yamakawa, for the reasons discussed below.

Specifically, the Examiner’s alleged motivation, *i.e.* for the purpose of recording a color image, is wholly unsupported by Iwasaki. Iwasaki *already discloses* a system that emits multi-color light from a combined light source, *i.e.*, each of the three disclosed LED’s 7-9 respectively emits a different color.

Thus, there would have been no need to modify Iwasaki in view of the complicated system of Yamakawa to provide a function that Iwasaki already provides.

Thus, Applicants respectfully submit that independent claim 14 is patentable over the applied references. Further, Applicants respectfully submit that dependent claim 15 is allowable, *at least* by virtue of its dependency.

Thus, Applicants respectfully request that the Examiner withdraw this rejection.

The Rejection of Independent Claim 16 over Iwasaki in view of Shimoda and Yamakawa

Iwasaki, Shimoda and Yamakawa are fully discussed above.

As discussed above, the Examiner takes the position that an alleged combination of Iwasaki and Shimoda discloses all the features of claims 14-17, except “for the plurality of printing heads.” (See Office Action, pg. 8, 1st full par.).

Applicants agree that neither Iwasaki, Shimoda, nor any alleged combination thereof teach or suggest such features.

Nevertheless, the Examiner takes the position that Yamakawa discloses such features in FIG. 4, and that one of skill would have modified the alleged combination of Iwasaki and Shimoda “for the purpose of recording color image on the photosensitive material with combined light sources of three primary colors.”

As an initial matter, Applicants respectfully submit that one of skill at the time of the invention would not have modified Iwasaki and/or Shimoda in view of Yamakawa, for the reasons discussed above with respect to claim 14.

Further, even if the references could have somehow been combined as the Examiner alleges, Applicants respectfully submit that the resultant combination would still not teach or suggest the “three optical printing heads” recited in claim 16.

Specifically, there is only one optical printing head shown in FIG. 4 of Yamakawa (with three light sources 21a, 21b and 21c). In fact, the Examiner himself has alleged that the three light sources 21a, 21b and 21c correspond to the “three light emitting element array units” that are part of an “optical printing head,” as recited in claim 14. It is inconsistent for the Examiner to allege that light sources 21a, 21b and 21c correspond to both multiple light sources within a single printing head, and three separate printing heads.

Thus, Applicants respectfully submit that independent claim 16 is patentable over the applied references. Further, Applicants respectfully submit that dependent claim 17 is allowable, *at least* by virtue of its dependency.

Thus, Applicants respectfully request that the Examiner withdraw this rejection.

New Claims

Claims 18-29 are hereby added.

Claim 18 recites that the “light emitting elements are arranged in-between portions of the partitioning device.” Claim 18 is fully supported *at least* by FIG. 4 of the instant Application. Claim 18 is respectfully submitted to be allowable *at least* by virtue of their dependency.

Additionally, claim 18 is respectfully submitted to be allowable over, for example, Iwasaki, which discloses LED’s 7, 8 and 9 arranged in recesses 4, and thus not “in-between” partition walls 222.

Claim 19 recites that the partitioning device “comprises a plate-like structure with an upper and lower surface extending substantially parallel to the substrate.” Claim 19 is fully supported *at least* by FIG. 5 of the instant Application. Claim 19 is respectfully submitted to be allowable *at least* by virtue of its dependency.

Additionally, claim 19 is respectfully submitted to be allowable over all of the applied references, as the portions cited by the Examiner as being comparable to the recited “partition device” (*i.e.*, partition walls 222 of Iwasaki or light blocking means 18 of Yano) are individual walls that extend orthogonally to the surface of the substrate. No portion of partition walls 222 of light blocking means 18 of Yano have both an upper and lower surface that extend substantially parallel to the substrate.

Claim 20 recites that “the light emitting elements are positioned in at least four rows arranged orthogonally to the conveying direction of the photosensitive material.” Claims 21 and 22 are dependent therefrom. Claims 20-22 are fully supported *at least* by FIG. 10 (and its accompanying description) of the instant Application. Claims 20-22 are respectfully submitted to be allowable *at least* by virtue of their dependency.

Additionally, claims 20-22 are respectfully submitted to be allowable over all of the applied references, as none teach or suggest four rows of light emitting elements, as recited in claim 20.

Claim 23 further describes the structure of the three converging lens system recited in claim 16. Claim 23 is fully supported *at least* by FIG. 11 of the instant Application. Claim 23 is respectfully submitted to be allowable *at least* by virtue of its dependency.

Additionally, claim 23 is respectfully submitted to be allowable over all of the applied references, as no references teach or suggest rays directed towards a single point on the photosensitive material from three different angles.

Claims 24 and 25 further describe the structure of the dichroic mirrors recited in claim 14. Claims 24 and 25 are fully supported *at least* by FIG. 12 of the instant Application. Claims 24 and 25 are respectfully submitted to be allowable *at least* by virtue of their dependency.

Claim 26 recites that the “light emitting elements have a dark spot at a radially center portion thereof.” Claim 26 is fully supported *at least* by FIG. 3 (and its accompanying description) of the instant Application. Claim 26 is respectfully submitted to be allowable *at least* by virtue of its dependency.

Claims 27 and 28 further describe the diffusion plate recited in claim 1. Claims 27 and 28 are fully supported *at least* by the paragraph bridging pages 8 and 9 of the Application. Claims 27 and 28 are respectfully submitted to be allowable *at least* by virtue of their dependency.

Additionally, Applicants respectfully submit that claims 27 and 28 are separately patentable over the applied references, as none teach or suggest these specific features of a diffusion plate.

Claim 29 recites that “less than all of the light emitting elements are activated to emit light at a single time, and specific patterns are thereby generated on the photosensitive material.” Claim 29 is fully supported *at least* by the first full paragraph of page 10 of the Application. Claim 29 is respectfully submitted to be allowable *at least* by virtue of its dependency.

Additionally, Applicants respectfully submit that claim 29 is separately patentable over, for example, Yano, which discloses that all of the light emitting elements 12 are utilized at a single time to erase the electric charge from a non-image area B, and Shimoda, which utilizes all of the LED's 120 at the same time to provide a yellow dot matrix.

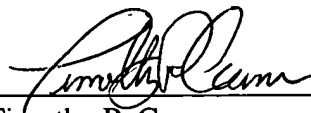
Conclusion

In view of the foregoing, it is respectfully submitted that claims 1-29 are allowable. Thus, it is respectfully submitted that the application now is in condition for allowance with all of the claims 1-29.

If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Please charge any fees which may be required to maintain the pendency of this application, except for the Issue Fee, to our Deposit Account No. 19-4880.

Respectfully submitted,



Timothy P. Cremen
Registration No. 50,855

SUGHRUE MION, PLLC
2100 Pennsylvania Avenue, N.W.
Washington, D.C. 20037-3213
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE

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